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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,969	08/06/2003	Bong-Hyun Kim	2522-024	1246
7590 09/22/2004			EXAMINER	
MARGER JOHNSON & McCOLLOM, P.C. 1030 S.W. Morrison Street Portland, OR 97205			LE, THAO P	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/635,969	KIM ET AL.	
	Examiner	Art Unit	
	Thao P. Le	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/6/03, 4/1/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledge is made of applicants' claim for foreign priority base on an application 10-2002-48981 filed in Korea on 08/19/02.

Information Disclosure Statement

2. Information Disclosure Statement (IDS) filed on 08/06/03, **04/01/04** and made of record . The references cited on the PTOL 1449 form have been considered.

Claim Rejections

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. **Claims 1-2, 4, 5, 9-10, 11-12, 14, 18-19, 21-24 are rejected under 35 USC 102 (a) as being anticipated by Chang et al., U.S. Patent No. 6,380,029.**

Regarding claims 1, 11, 21, Chang et al. discloses a method of forming a gate in a non-volatile memory device comprising (See Fig. 2E-2F and Cols. 3-8):

- . forming a tunnel dielectric layer 42 on a semiconductor substrate 40 (See Fig. 2E);
- . forming a floating gate layer 44 on the tunnel dielectric layer;
- . forming an integrate dielectric ONO layer 46 on the floating gate;
- . forming a control gate layer 48 on the ONO layer;
- . forming metal silicide 50 on the control gate;
- . annealing the structure (line 67, Col. 7);
- . patterning the silicide layer, control gate layer, the ONO layer, and the floating layer to form gate stack (Fig. 2F).

The control gate layer is formed comprising an in-situ doped silicon layer on the dielectric layer (doped silicon in CVD, lines 47-55, Col. 7).

Regarding claims 2, 12, Chang et al. discloses the forming of floating gate layer comprises forming polysilicon (line 4, Col. 7).

Regarding claim 4, Chang et al. discloses wherein the integrate dielectric layer comprises ONO (lines 18-20, Col. 7).

Regarding claims 5, 9-10, 14, 18-19, Chang et al. discloses the control gate material is polysilicon and the annealing the control gate comprises RTA at temperature of about between 800-1000 oC (lines 47-67, Col. 7; RTA at 900 oC).

Regarding claim 22, it is inherent that RTA is performed in an ambient including an inert gas.

Regarding claims 23-24, Chang et al. discloses wherein forming a metal silicide layer comprises using dichlorosilane gas to form a tungsten silicide layer (lines 57-63, Col. 7) and wherein the annealing is performed after forming the tungsten silicide layer (line 67, col. 7).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 6-8, 15-17 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Chang et al., U.S. Patent No. 6,380,029.

Regarding claims 3, 6, 13, and 15, Chang et al. discloses the floating gate and control gate are formed using polysilicon but fail to disclose the floating gate and control gate are formed using amorphous silicon. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either polysilicon or a-

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silicon because both material participate in non-volatile device would have carrying out similar function.

Regarding claims 7-8, 16-17, Chang et al. discloses the annealing is performed using RTA but fails to disclose the use of furnace annealing at a temperature of about 600-900 oC. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either RTA or furnace annealing to anneal the structure because both annealing techniques would yield the same result of annealing the structure.

7. When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le'.

Thao P. Le
Examiner
Art Unit 2818
Sept. 18, 2004